Action Prediction Across Match-on-Action Cuts in Infancy

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MOPIGRASFIT

"**MO**TION **PI**CTURE **G**RAMMATICAL **RA**TING **S**YSTEM **F**OR **I**NFANTS AND **T**ODDLERS"

MARIE SKŁODOWSKA-CURIE ACTIONS

Individual Fellowships

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The use of infant-directed media

- has increased from 17% in the 1990s to over 50% in the first year of life by 2005 (Rideout & Hamel, 20006).
- The revenue of Baby Einstein company (which was founded in 1996 for $18000) grew from $1 million in 1998 to $25 million in 2001 and **$400 million in 2013.**
- **Baby TV** is distributed in over 100 countries in 18 languages
- Despite the recommendation of American Academy of Paediatrics (1999, 2011) to avoid exposing children under 2 to television, an estimated 90% of parents show television and videos to their infants (Zimmerman, Christakis, & Meltzoff, 2007)

Existing Motion picture rating systems in the EU

- Only target viewers above 3 years.
- Only deal with the content, not formal features
- Infant-directed videos include a wide range of cinematic techniques and it is not known if they are able to make sense of them.

Objectives

to assess systematically the role of

- cinematic techniques
- viewing experience
- cognitive development

on the comprehension of moving images and on the basis of the findings

to suggest an "age-appropriateness" rating scheme for infants and toddlers (e.g. 12m+, 24m+) for audiovisual material.

Infants attention to edited moving-images

begins by being stimulus-driven (e.g. attention is drawn by movement and sudden changes)

progresses to more top-down control as the child matures cognitively and acquires general world knowledge as well as knowledge about formal features (i.e. gains film literacy)

Anderson & Levin, 1976; Anderson, Lorch, Field, & Sanders, 1981; Crawley, Anderson, Wilder, Williams, & Santomero, 1999; Lemish, 1987; Takahashi, 1991; Richards & Gibson, 1997

Film Literacy

Once one begins to look at a film as if it were a linguistic communication—and here we would like to emphasize the "*as if*" and not prejudge whether film is or is not really a form of language—a host of intriguing questions arise. If film is a "language," are there different "languages" of film? Are there native speakers of film? And if so, do they correspond to those who speak the different "languages" of film? If languages have lexicons that order words as synonyms and order utterances as paraphrases, can we find evidence of such units in film communication?

Sol Worth and John Adair
Navajo Filmmakers, 1970

If film is a language,

when and how babies learn it?

Film Literacy

Since Muensterberg , many film scholars have explained film comprehension by its similarity to the perception of real scenes and events in spite of the mismatch between the psychologically perceived continuity and the spatiotemporally discontinuous nature of the visual information.

Some of them argued that the principles of film editing mimic the course of natural attention.

Film Literacy

Two effective ways to disentangle the contributions of natural perception and knowledge of filmic conventions are

- investigating members of cultures without any contact to films
- conducting developmental studies

Naïve Viewers

No Continuity

Continuity

Schwan & Ildirar, 2010; Ildirar & Schwan, 2015; Ildirar, Levin, Schwan, Smith, 2015

Action Through Cuts

Match-on-action

An editing technique where a subject begins an action in one shot and carries it through to completion in the next (Anderson, 1996; Bordwell & Thompson, 2001).

The visual bridge created between shots distracts the viewer from noticing the cut and provides continuity perception (ie. edit blindness; Smith & Henderson, 2008).

This technique was believed to function by creating a saccadic eye movement towards the motion (Dmytryk, 1986) or, with extreme changes in action, causing an eye blink (Dmytryk, 1986;Murch, 2001) or, by obscuring the cut with motion blur (Pepperman, 2001). More recently, it is thought that it works by cuing attentional shifts pre-cut and limiting the availability of attention and perceptual discrimination ability of viewers towards the cut (Smith, 2012; Smith & Martin-Portugues Santacreu, 2016).

Action Through Babies' Eyes
Visual Anticipation

An actor places objects in a bucket

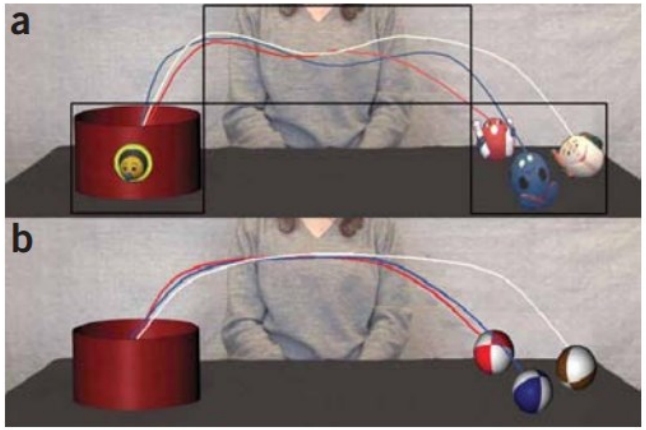


Figure 1 Sample pictures of stimulus videos. (**a**) Stimulus in the human agent and self-propelled conditions with areas of interest (AOIs; black rectangles) and trajectories for each object (colored lines) superimposed. Left AOI was labeled "goal AOI," right AOI was labeled "object AOI," and upper AOI was labeled "trajectory AOI." (**b**) Stimulus in the mechanical motion condition.

Falck-Ytter, Gredebäck, and von Hofsten, 2006

Ability to anticipate the goal of a perceived action

12-month-old infants and adults fixate the goal of an ongoing manual action. Six-month-olds did not fixate the goal of these actions.

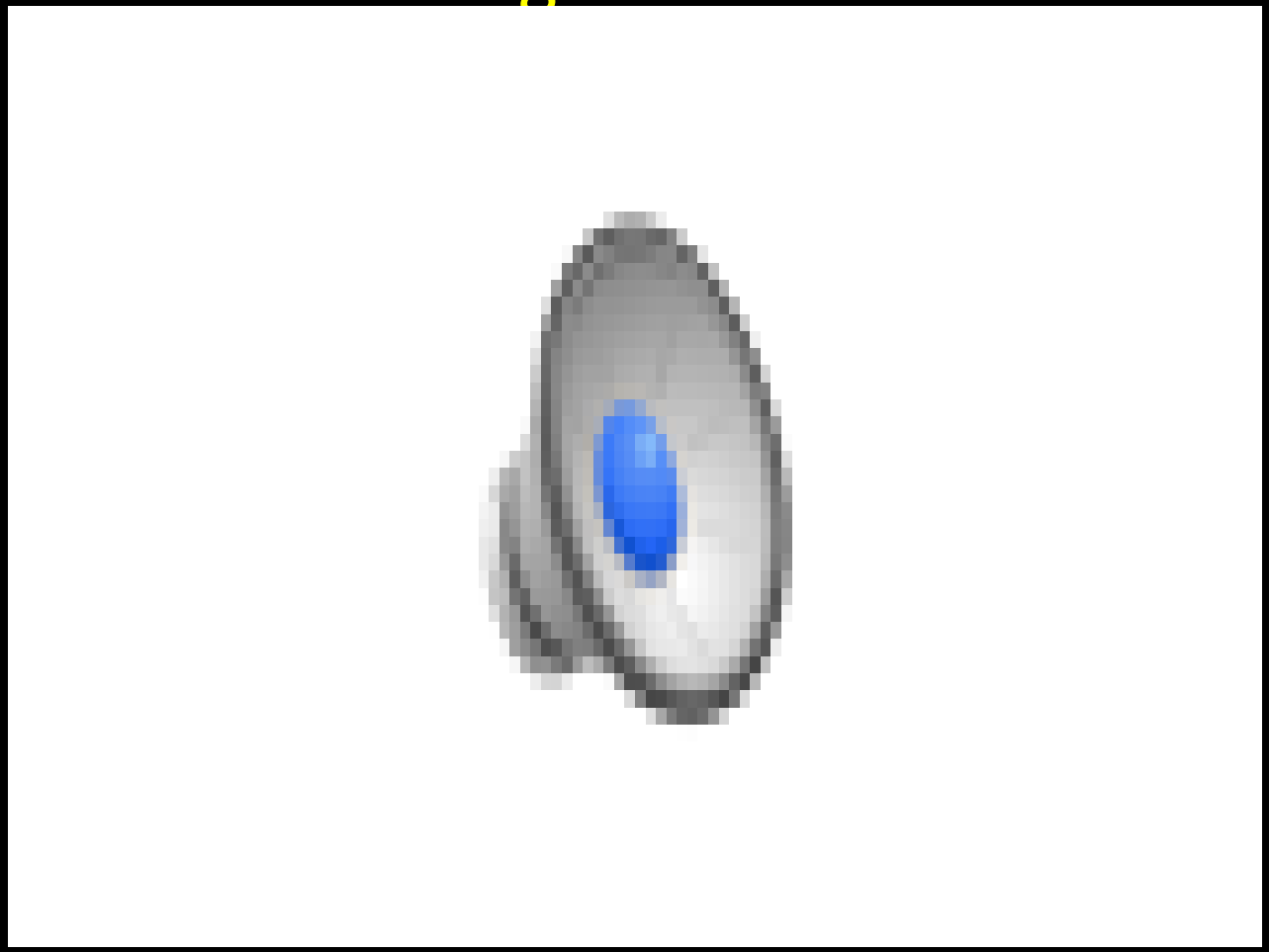
When the objects moved on their own, both 12-month-olds and adults performed much like the 6-month-olds. They tracked the moving hand rather than fixating the goal.

Research Question 1

Can 12 month-olds still anticipate the goal of the perceived action, when the action distributed through film shots?

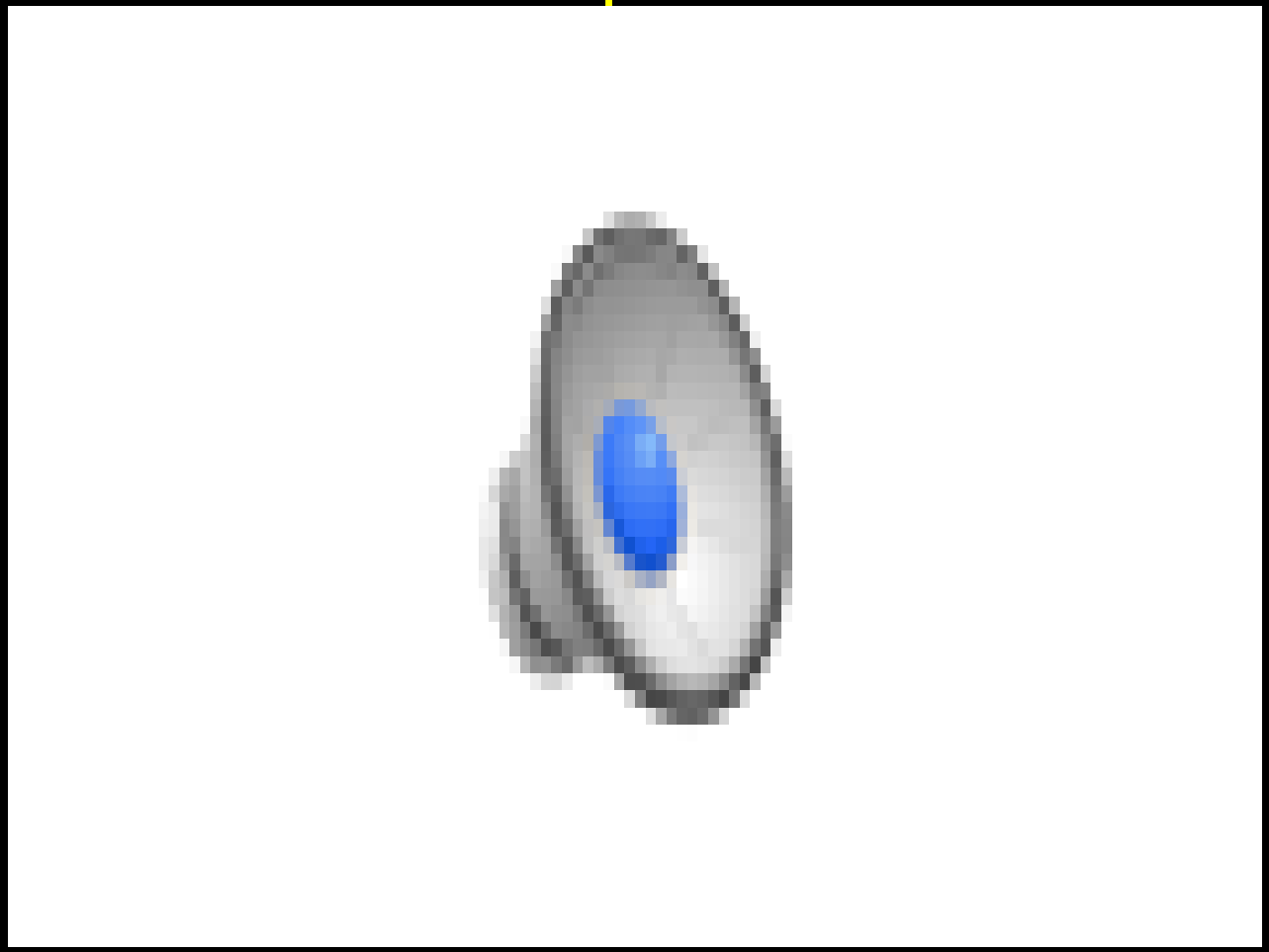
Stimuli

Action Prediction-Single Shot



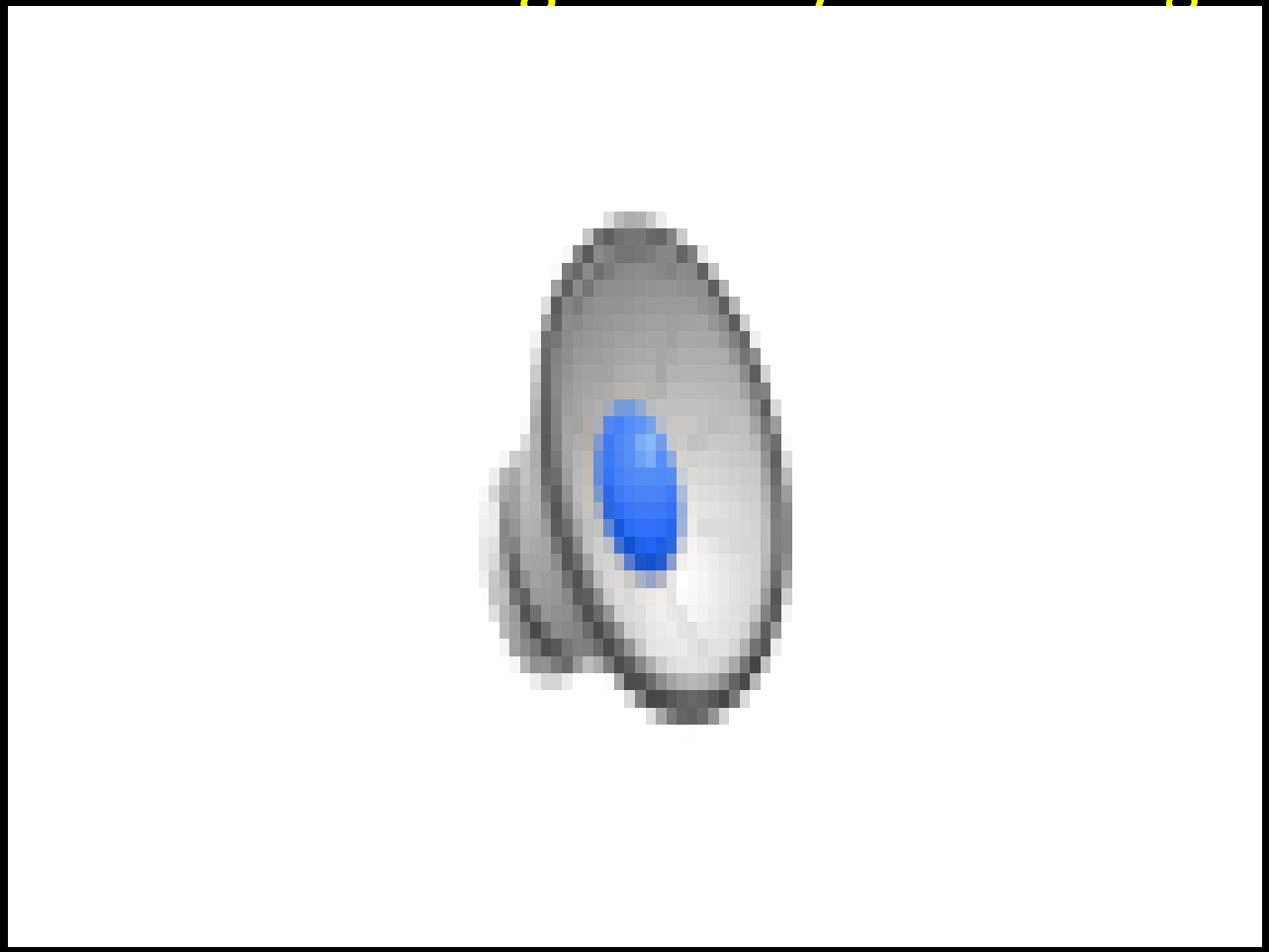
Stimuli

Action Prediction-Multiple Shot



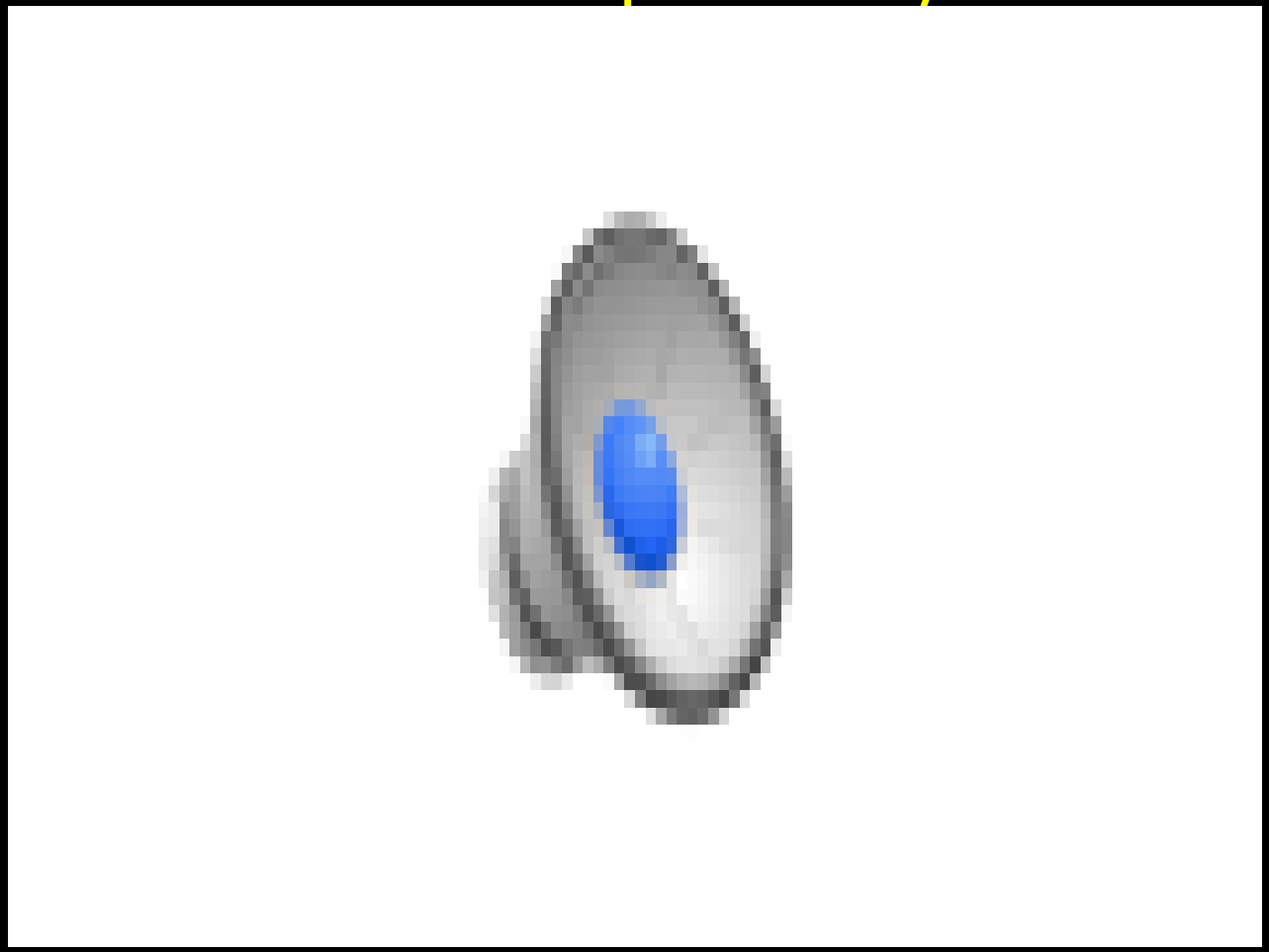
Stimuli

Action Prediction-Single Shot / without agent



Stimuli

Action Prediction- Multiple Shot /without agent



Participants of the Pilot Study

- 6 adults (age:36-70, M: 51.5 years)
- 4 preschoolers (M: 35 months) – all eliminated
- 5 toddlers (age: 12-14, M: 12 months)

Apparatus

- Tobii TX-60 eye tracker with a sampling rate of 60 hertz
- 22-inch monitor
- 1920x1080 screen resolution

Procedure

During the eye tracking assessment the babies sited on their mother's lap at an approximately 60-centimeter viewing distance in front of the monitor that was connected to the eye tracker.

Design

1st Study (Visual Anticipation)

2 (age: 12 moa vs adult: Between Subjects) x 2 (multiple vs single: Within Subjects) x 2 (with vs without agent: Within Subjects) – A control group will see only the freeze frames

2nd Study (Gaze Following)

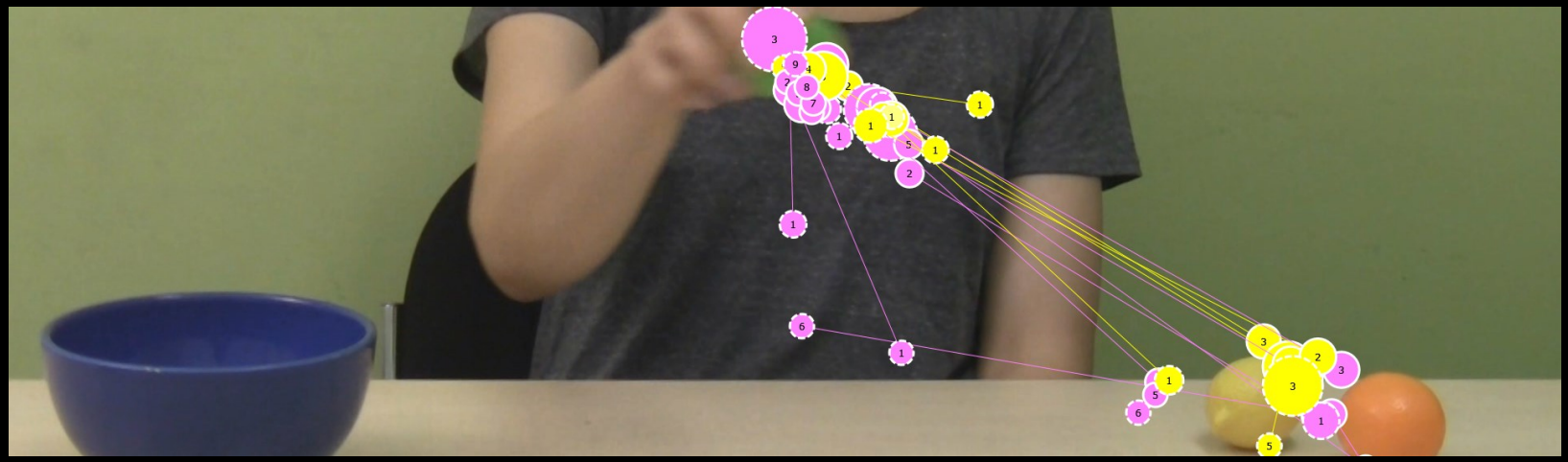
2 (age: 12 moa vs adult: Between Subjects) x 2 (multiple vs single: Within Subjects) x 2 (with vs without gaze cue: Within Subjects) – Right Left Counterbalanced

CVs: Age, gender, watching experience

DV: Time to First Fixate target AOIs

First Findings

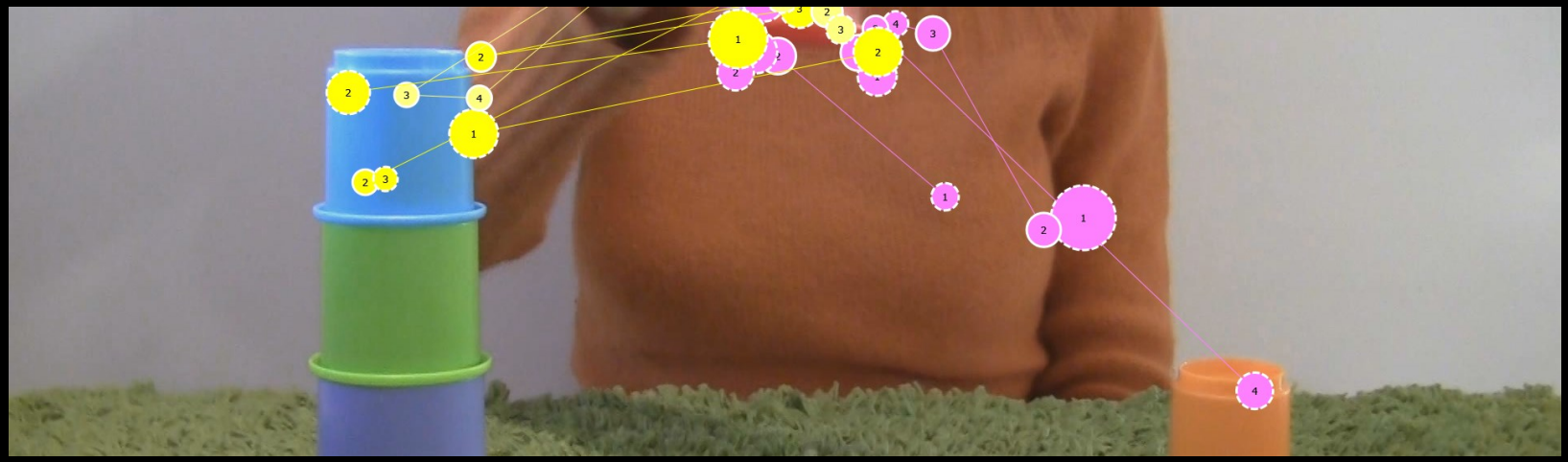
Single Shot



Adults

Babies

First Findings
Multiple Shots

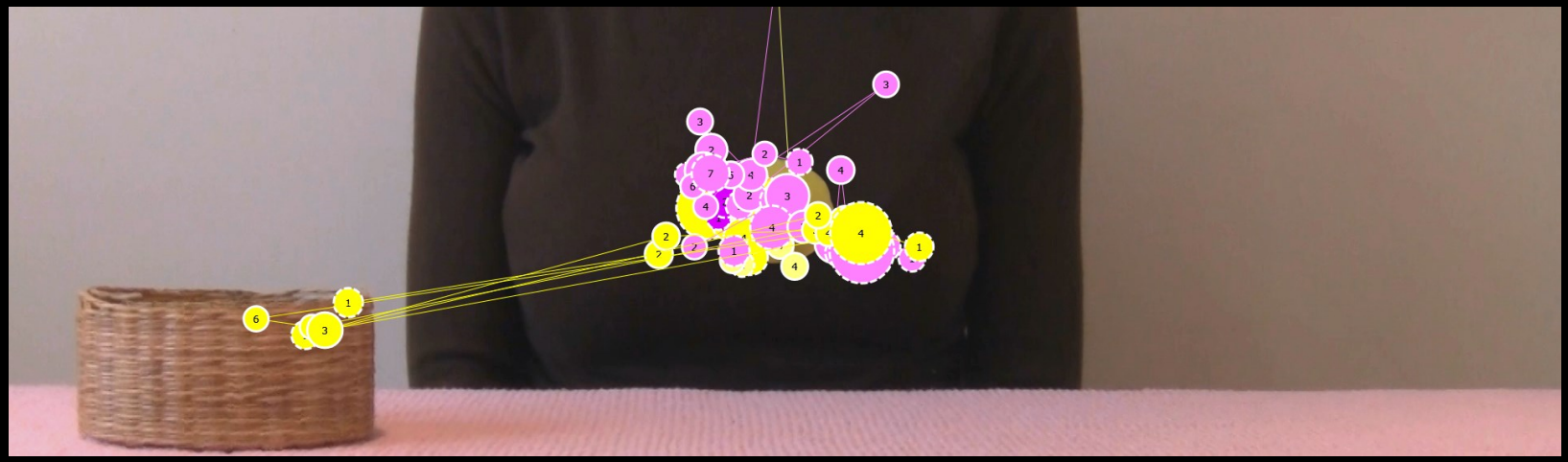


Adults

Babies

First Findings

Single Shot – No Agent

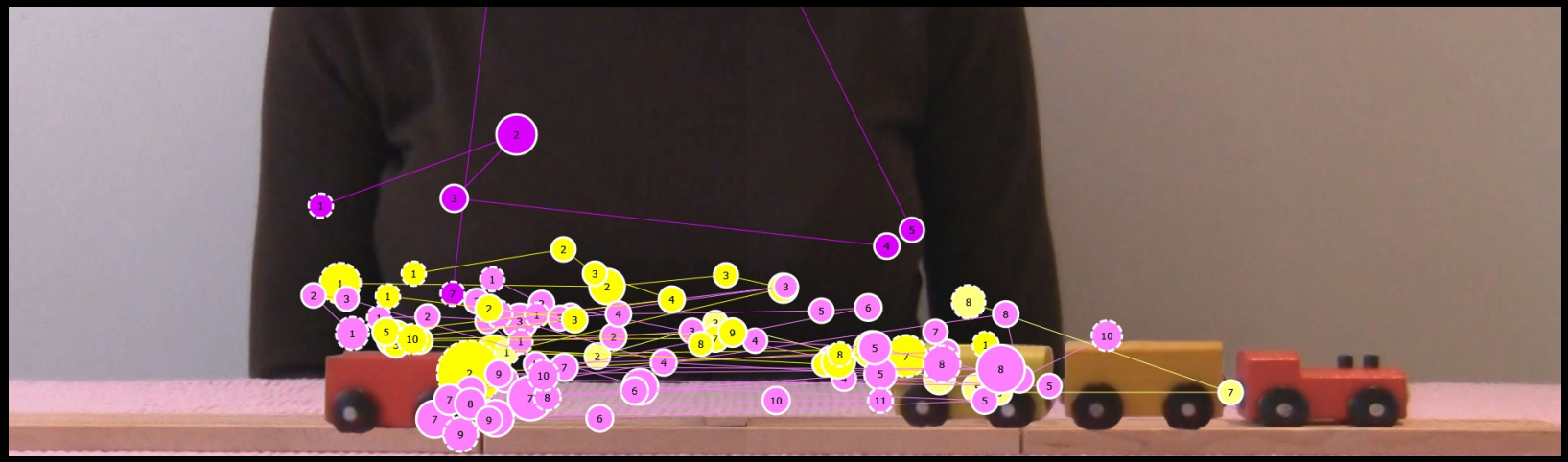


Adults

Babies

First Findings

Multiple Shots – No Agent



Adults

Babies

Naïve Viewers

No Continuity

Continuity

Schwan & Ildirar, 2010; Ildirar & Schwan, 2015; Ildirar, Levin, Schwan, Smith, 2015

Gaze Through Cuts
POV Shot or Eye-Line Match

We see a person looking at an object offscreen (eyeline, direction of gaze) and then we see the object itself (from the person's point of view) and we link these two images together in our minds and conclude that such person is looking at such object.

It can be considered as a reciprocity of natural attentional shift between the looker and the object based on the gaze cue.

Gaze Through Babies' Eyes – Gaze Following

Bedford et. al, 2012

The ability of gaze following (looking where someone else is looking) emerges by infants as young as 6 months old when the targets within their visual field (D'Entremont, Hains, &Muir, 1997).

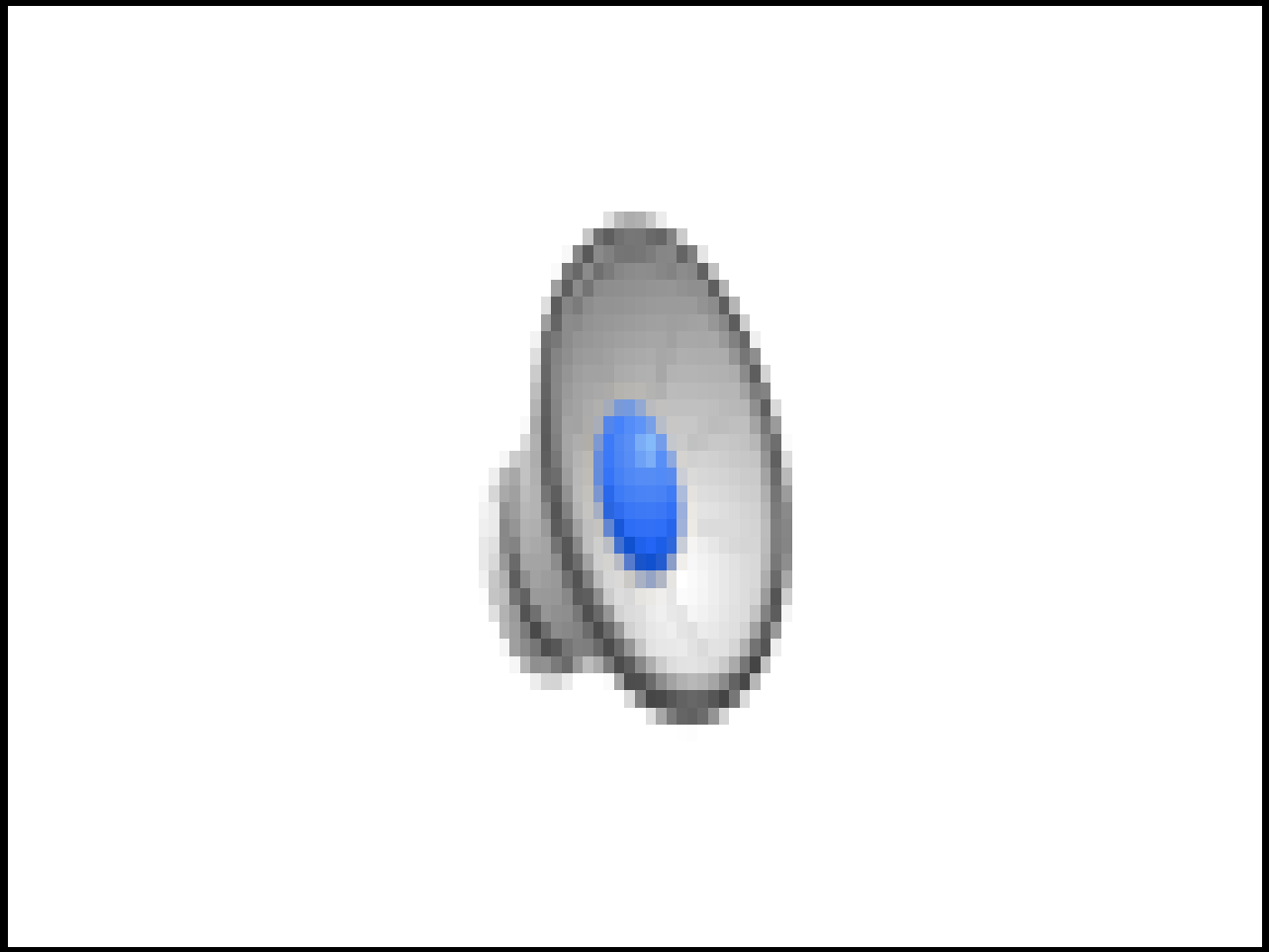
By 12 months, infants turn to see what the other is seeing (Baron-Cohen, 1994; Bretherton, 1991; Tomasello, Kruger, & Ratner, 1993).

Gaze following to targets outside the immediate visual field does not typically appear until the end of the first year (Butterworth & Jarrett, 1991; Corkum & Moore, 1995, 1998).

Research Question 2

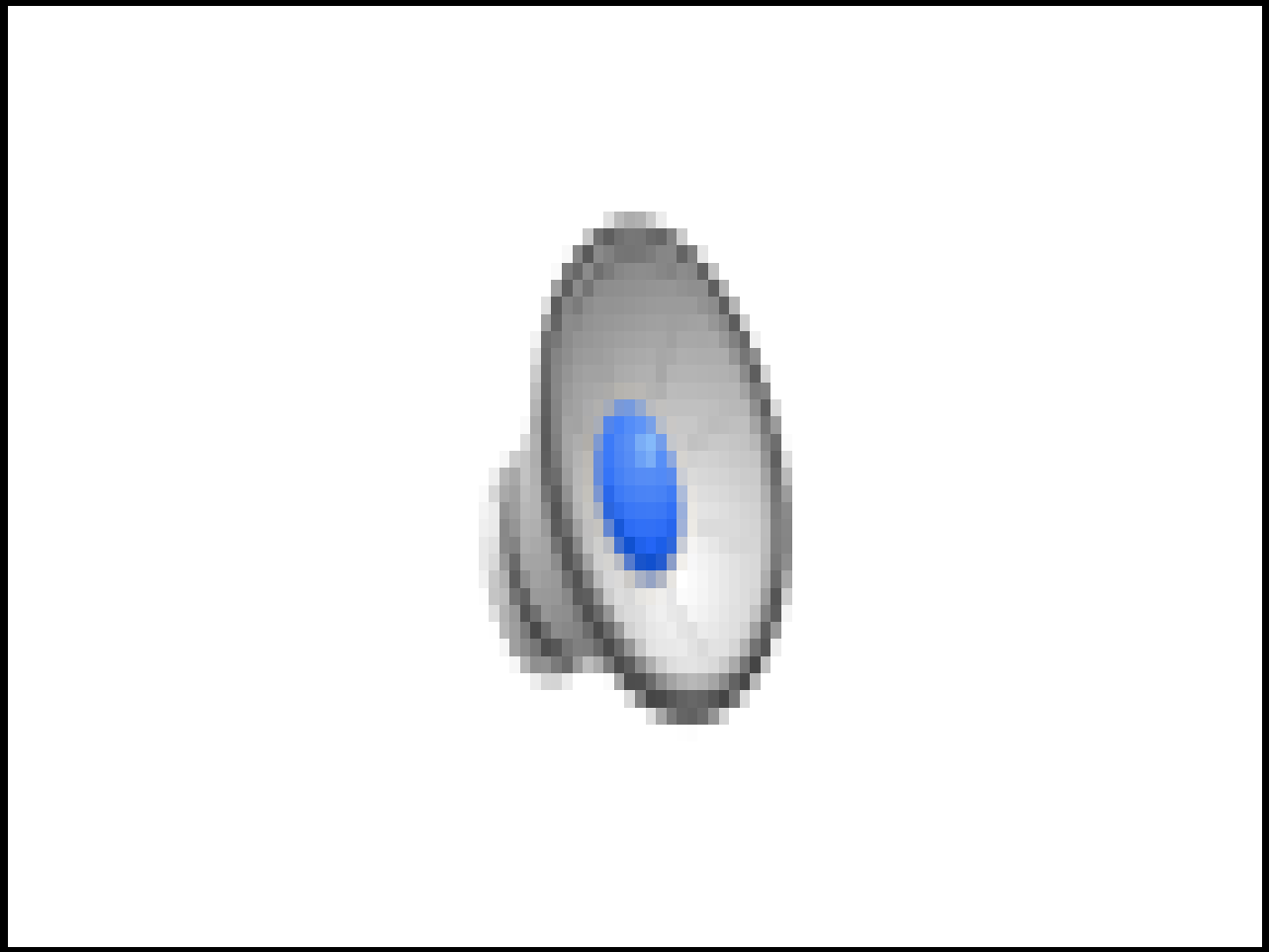
Can 12 month-olds still follow the gaze of others when the cueing is performed in the closer shot where the objects are not to be seen?

Stimuli
Gaze Following-Single Shot



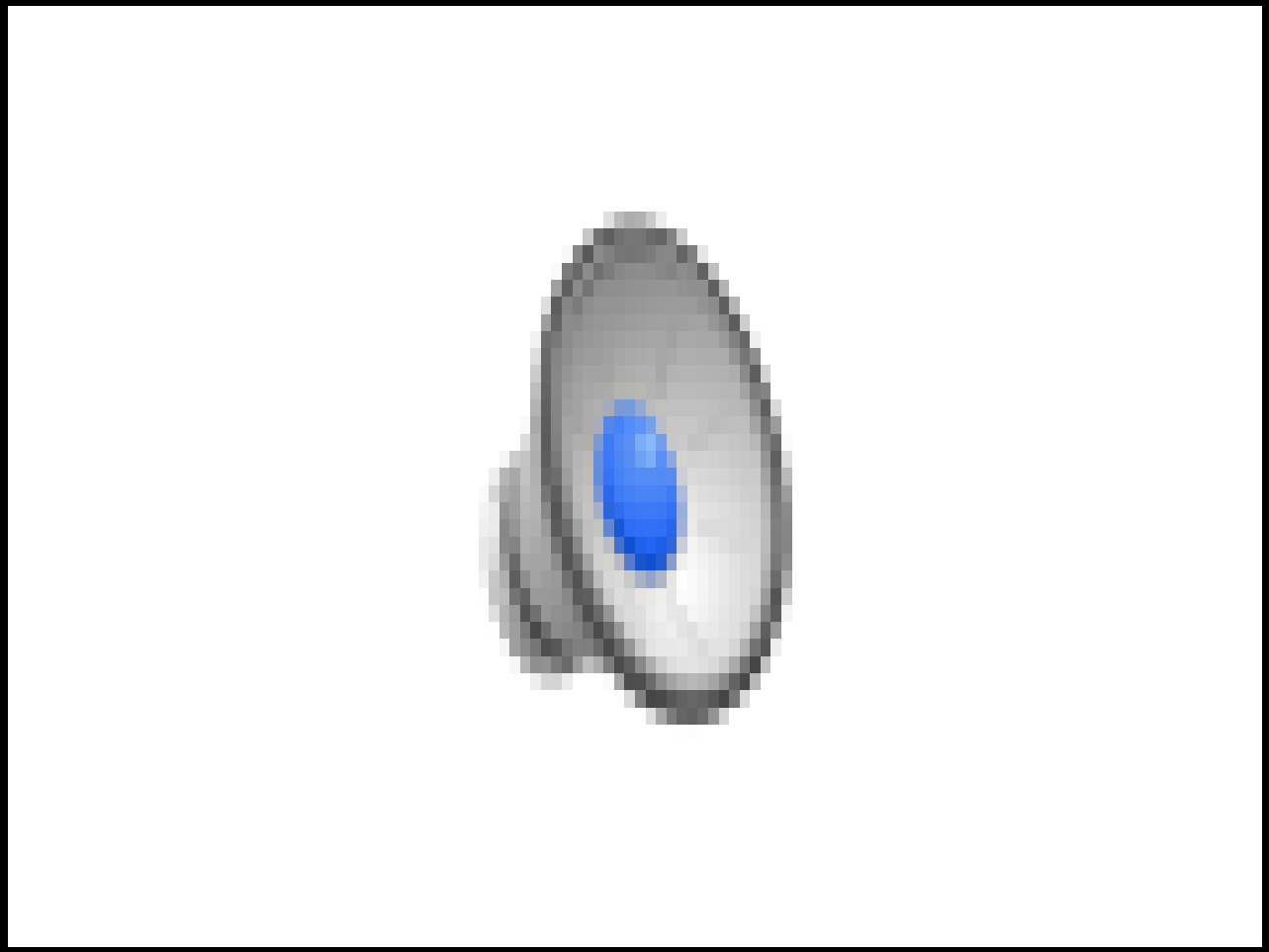
Stimuli

Gaze Following-Multiple Shots



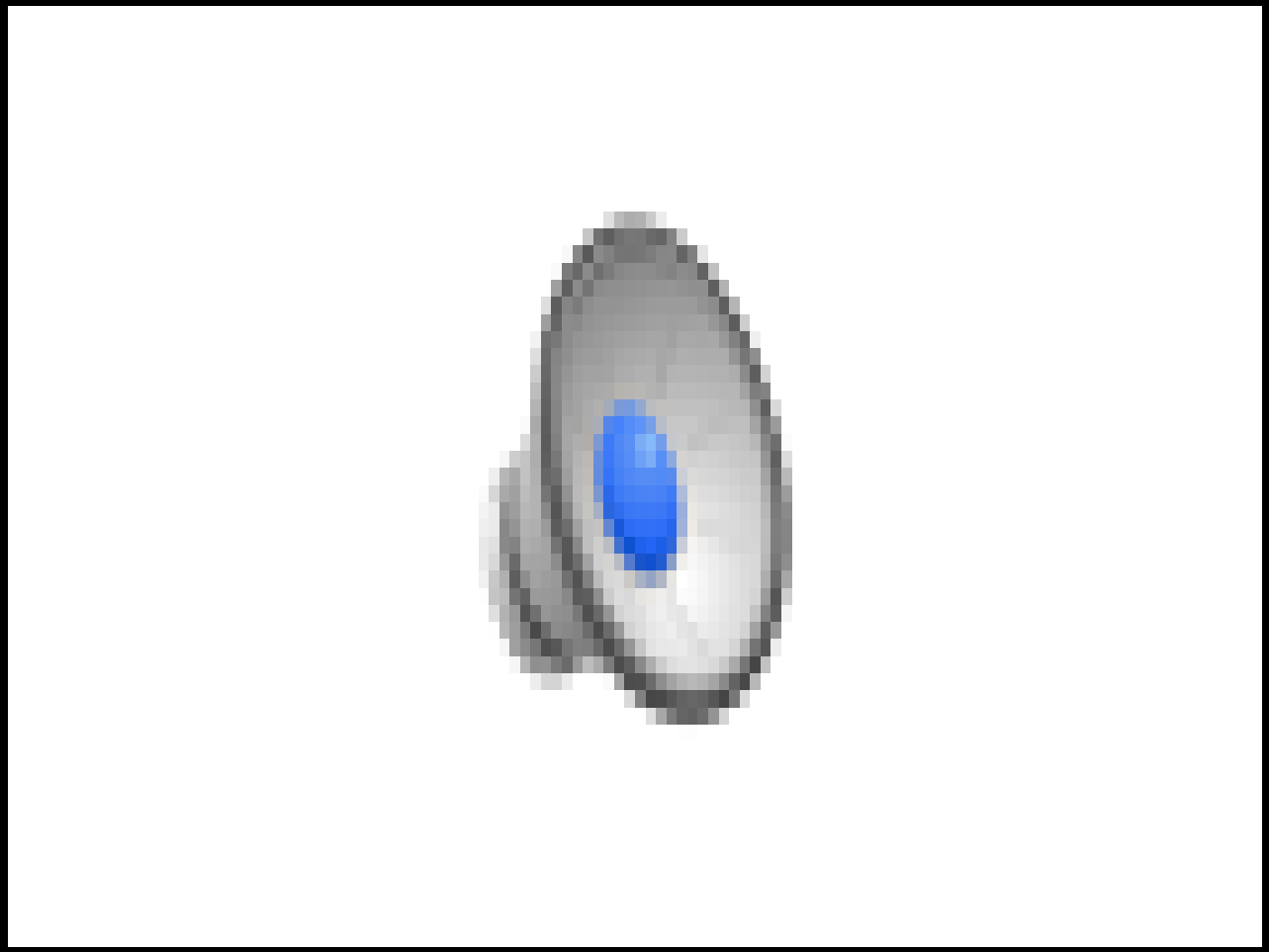
Stimuli

Gaze Following-Single Shot (no cue)

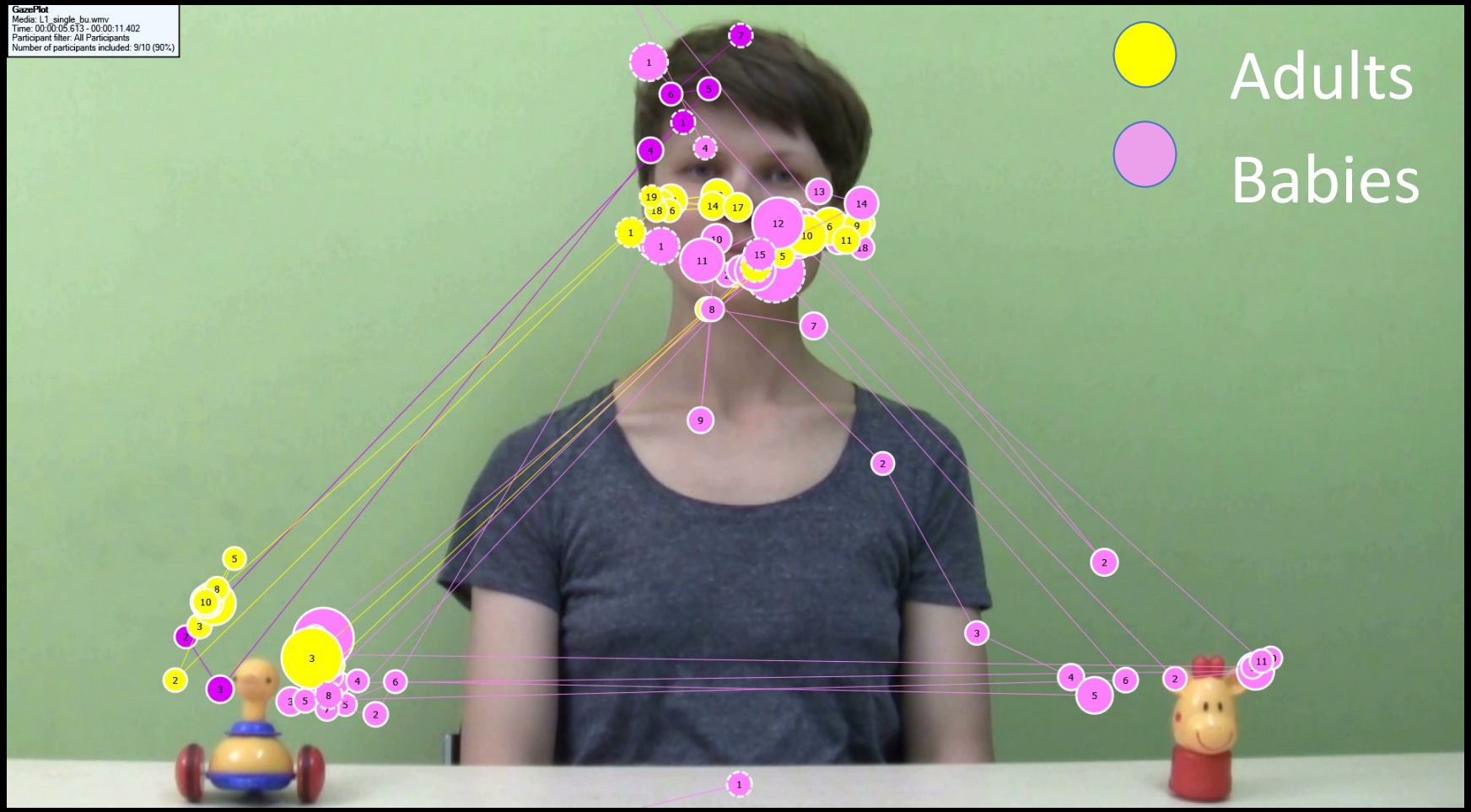


Stimuli

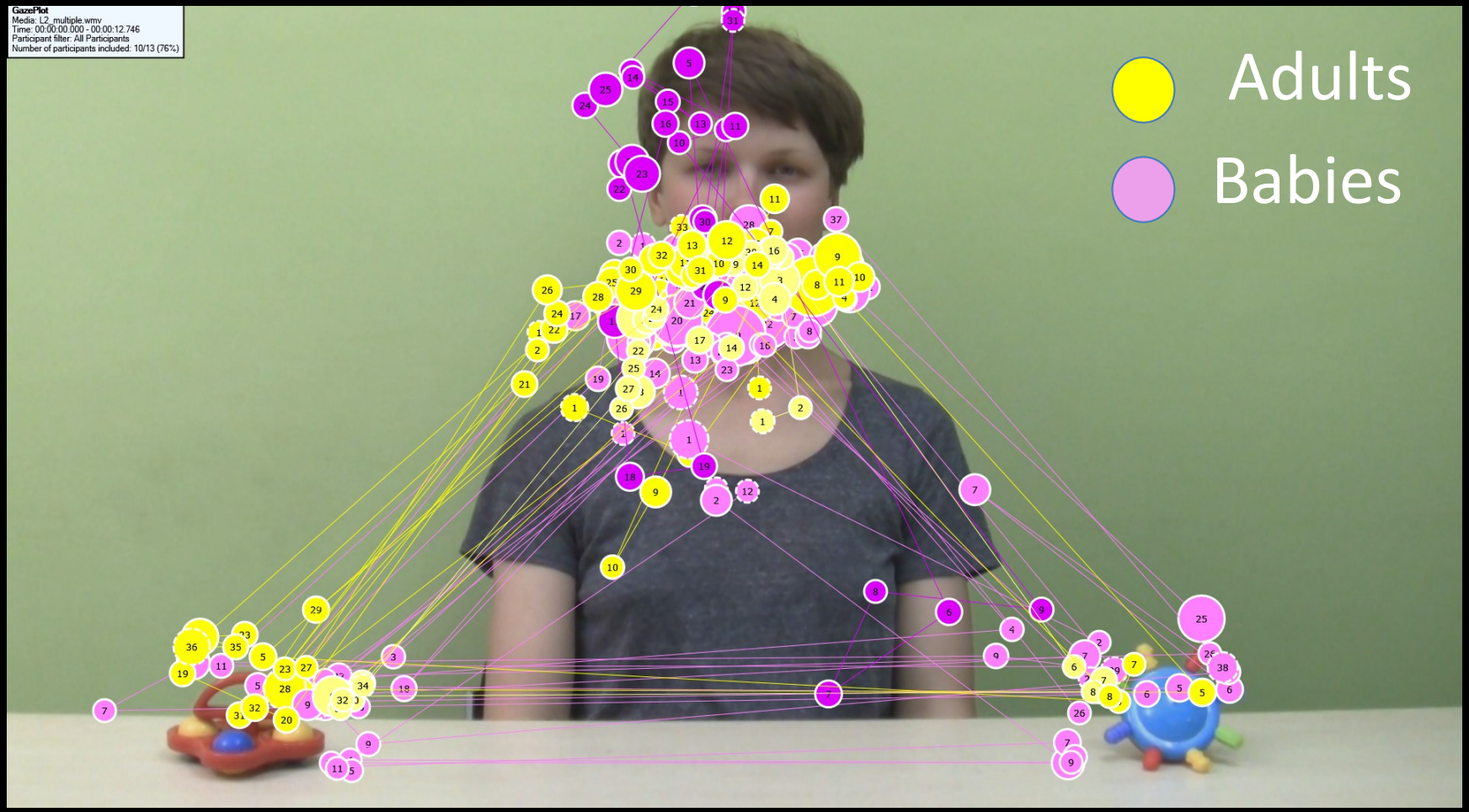
Gaze Following-Multiple Shots / no gaze cue



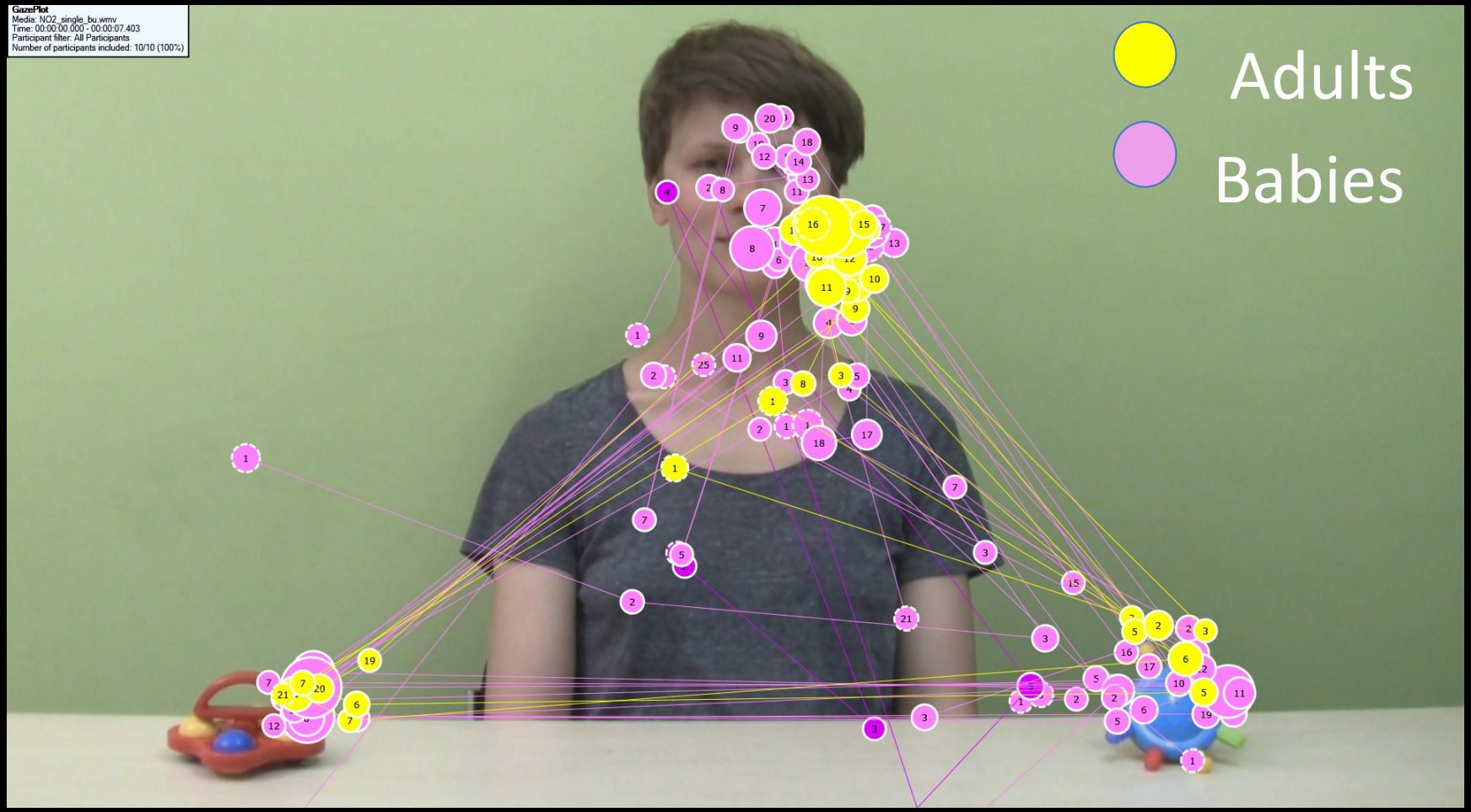
First Findings – Single Shot/Left



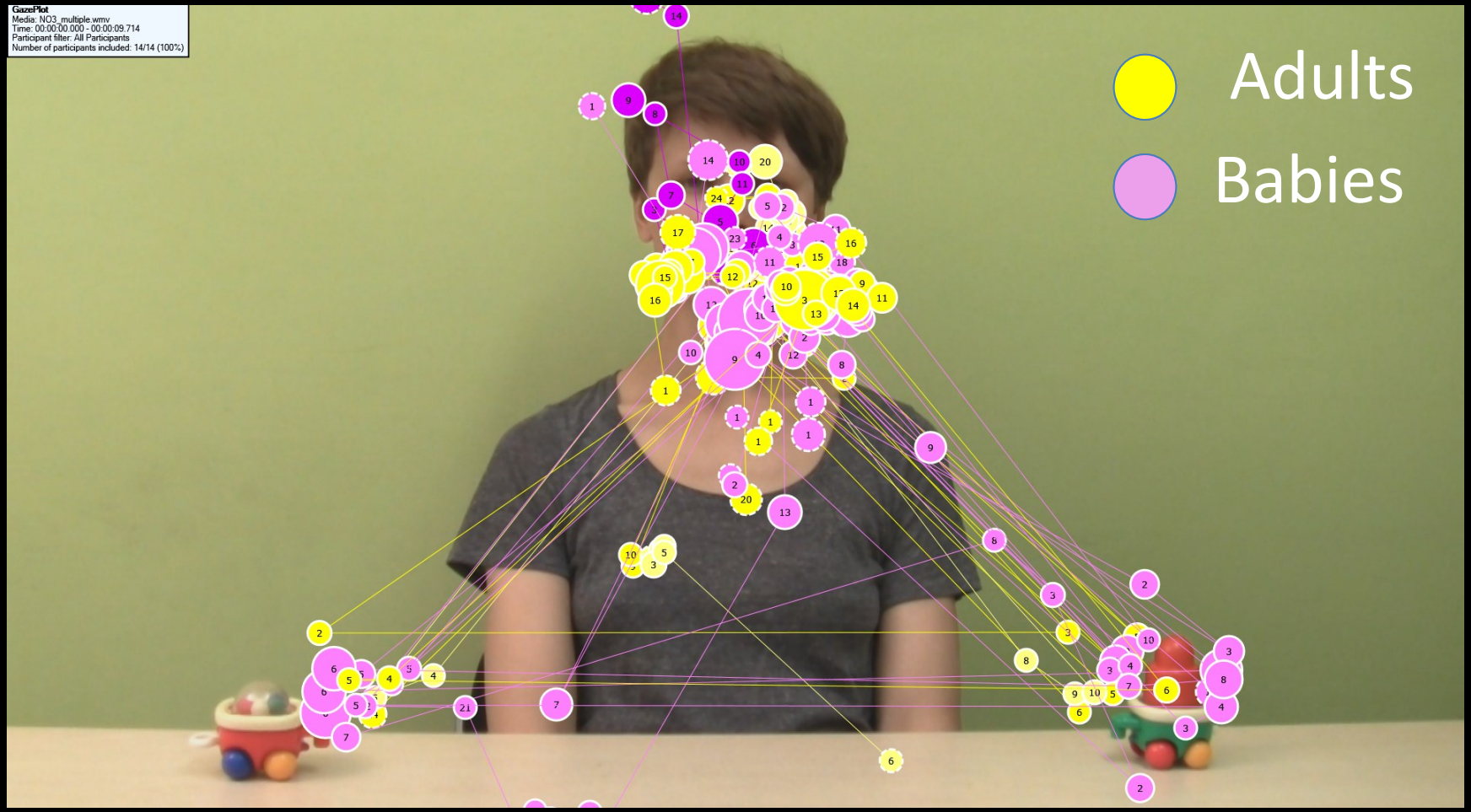
First Findings – Multiple Shots/Left



First Findings – Single Shot/no cue



First Findings – Multiple Shots/no cue



Limitations and Recommendations for Further Research

- Small sample size
- It seems like 12 months olds have some difficulties connecting the shots.
- We need to find out what techniques work for babies and when they start to work (Zooms, pans and tilts might work)
- The role of sound needs to be taken in consideration

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